8. Public Policy Affecting the Waste-to-Energy Industry

Introduction

Public policy at the State, local, and Federal levels has been and continues to be the primary factor affecting the historic rise, recent leveling off, and near-term outlook of the municipal solid waste industry's contribution to the Nation's energy supplies. Environmental regulations and policies that at one time encouraged the combustion of waste into energy are currently emphasizing pollution control at waste-to-energy (WTE) facilities and recycling as the preferred waste disposal option. Federal tax policy no longer favors investments in capital-intensive projects such as WTE facilities. Energy regulations that once required utilities to buy energy from WTE facilities at favorable rates are being revamped to promote regional competition and lower energy prices. As the electric utility industry anticipates the effects of legislatively driven deregulation scenarios, the municipal solid waste (MSW) industry is already experiencing the effects of judicially driven deregulation decisions concerning their waste supplies.

To some extent, the MSW industry is a microcosm of the electric utility industry, and its current deregulation pains could provide insights into what lies ahead for the utility industry as a whole. Municipalities are currently making adjustments to protect their investments in waste facilities, a direct analogy to the "stranded assets" issue being debated in discussions of electric utility restructuring. Constitutional issues concerning the interstate flow of waste are currently working their way through the judicial system, and their resolution could ease the path or at least highlight similar problems that may arise as the electric utility industry is deregulated.

Economic Status

Municipal waste combustion is facing economically challenging times. Compared with the mid- to late 1980s, growth is slow. Major factors are the lack of adequate waste flows to projects; the growth of recycling, which has diverted potential waste from WTE facilities; successful court challenges to flow control and the interstate movement of waste, which have permitted private sector waste haulers and others to take refuse to the cheapest disposal sites; less favorable tax laws; and the reduction of revenues, particularly from electricity sales. Political considerations related to the siting and construction of WTE facilities constitute yet another challenge facing the industry.

In order to be economically viable, WTE projects have relied on (1) low capital costs, due to public financing, investment tax credits, and accelerated depreciation schedules; (2) a tipping fee structure, dependent on waste flow to amortize debt; and (3) revenues obtained from sale of electricity or steam or both. All of these elements are undergoing or have undergone change.

As a result of the Tax Reform Act of 1986, it is more difficult to publicly finance projects that are not controlled entirely by a public entity. Two of the major advantages to private ownership, investment tax credits and depreciation schedules, have been eliminated and lengthened, respectively (see box on page 80). Traditionally, many WTE projects have been financed with public monies but operated and owned by private companies. This type of public/private sector arrangement no longer qualifies as "public purpose" under the law. States and localities are restricted in the amount of revenue bond financing for public/private sector joint ventures they can undertake, and solid waste projects must compete with many other infrastructure projects for financing. Thus, it is no longer easy to secure low-cost public financing for a privately owned and operated WTE project, and tax law changes have eliminated some of the advantages of private ownership.

Tipping fees are an essential part of a WTE project, comprising 50 to 70 percent of the operating revenue stream. They thus provide the bulk of revenues necessary to maintain an operating profit. When a facility is being planned, a certain amount of waste flow is projected and a tipping fee is set accordingly. Through interlocal agreements, contracts, and other arrangements, a project must secure a waste flow. In the past, "put or pay" contracts were signed, which obligated municipalities to provide a certain amount of waste to the facility and pay a per-ton fee even if the projected amount was not forthcoming. In addition, many facilities relied on flow control legislation to ensure that waste would be directed to the plant.

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Taxes and Waste-to-Energy Facilities

Changes in tax law are a major hurdle to building new WTE facilities. The elimination of tax credits, the extension of depreciation schedules, and other tax changes have reduced the amount of capital private firms are willing to invest to ensure that an acceptable and competitive rate of return can be maintained. Consider, for example, a 1,500-ton-per-day WTE facility with capital costs of $150,000 per ton and a typical operating capacity of 85 percent. A firm that would have been willing to invest 17.5 percent of total costs under the old tax laws now must limit that investment to only 6 percent of total costs under the new tax laws in order to maintain the same 15-percent rate of return on equity. The other 11.5 percent of the capital costs must be financed with additional bonds and paid for with higher tipping fees. Tipping fees would have to rise by approximately 14 percent to fund the additional debt.*

Being unable to bring as much financial clout to the bargaining table, private firms are in a substantially weakened negotiating position. Moreover, WTE facilities have typical life expectancies of approximately 40 years. Public ownership means that the benefits accrue to the public, rather than private individuals, for some time after the 25-year bonds are paid off. Even if municipal governments decide against public ownership of WTE facilities, funding less capital-intensive waste disposal alternatives that are less significantly affected by the tax law changes requires smaller increases in tipping fees. A WTE facility, for example, may cost $100 to $200 million, whereas a landfill may cost only $20 to $30 million.**

*Based on cash flow analysis by David Livingstone of Smith Barney Shearson, one of the major underwriters of WTE bonds.

**U.S. Government Accounting Office, *Environmental Infrastructure: Effects of Limits on Certain Tax-Exempt Bonds*, GAO/RCED-94-2 (Washington, DC, October, 1993), p. 29.

Two major developments have occurred to upset this scenario. First, the amounts of waste initially projected by some of the WTE facilities did not materialize as expected; therefore, revenue targets were not met. Increased recycling, a lingering recession in certain areas throughout the early 1990s, and the availability of cheaper landfill space caused waste amounts available for combustion to drop. Localities challenged the "put or pay contracts" or waited until they ended and did not renew them. As waste flowed elsewhere or simply did not materialize, many WTE facilities had to raise tipping fees to meet debt and other obligations. The increase in tipping fees had the effect of driving more customers away, and some projects have found themselves in a downward spiral. The cost-effectiveness of WTE facilities could be enhanced in the future as the implementation of environmental legislation increases the cost of landfilling, but the effect could be offset by lower electricity prices as a result of deregulation.

National environmental policy is now causing waste streams to drop. Instead of encouraging incineration, the U.S. Environmental Protection Agency (EPA) is promulgating policy and providing technical guidance to promote waste reduction, reuse, and recycling. Municipal waste incineration is not a high priority.

A second development has been two Supreme Court decisions, Fort Gratiot Sanitary Landfill v. Michigan Department of Natural Resources (1994) and C&A Carbone v. Clarkstown (1994). These decisions effectively struck down laws prohibiting waste from moving across county or State lines, as well as local ordinances mandating that waste be brought to a specific project. Such legislation was ruled to be protectionism and a violation of the constitutional right to free interstate commerce. (See Chapter 9 of this report for more detail.)

Electricity revenues are also under strain due to the many changes occurring in the U.S. electric utility industry. Through the early 1980s, the United States was still reacting to the oil crises that had occurred in the previous decade and the specter of expensive energy in the years to come. Government policies were put in place to encourage the development of alternative domestic energy sources. WTE was seen as one such alternative. Under the Public Utility Regulatory Policies Act of 1978 (PURPA), utilities were mandated to purchase electricity from alternative sources at an avoided cost rate. When energy prices were high, avoided costs ranged from 3 to 12 cents per kilowatthour.[136] With lower electricity prices, revenues from the sale of electricity have fallen.

In addition, the Federal Energy Regulatory Commission (FERC) has ruled that special set-aside purchasing programs by utilities from alternative energy sites may not be permitted. Finally, with the ongoing deregulation of the utility industry, WTE electricity producers will have to compete in the marketplace to sell energy. Thus, just as public policy helped create the WTE industry, it is now a factor in slowing the industry's growth.

[136]Personal communication with Maria Zannes, Integrated Waste Services Association (October 16, 1996).

Siting Problems

From a political standpoint, it is not popular to support the incineration of refuse, even if energy is recovered. Many citizen groups oppose the construction of any type of plant in their immediate neighborhoods. They are concerned about air pollution and its effect on their health. Other problems seen by individuals include excessive truck noise and odor.

On a local level, many zoning and environmental reviews must take place for a plant to be sited, with multiple opportunities for public review and comment. These procedures make permitting of a facility a long and difficult task that can take 5 to 7 years.[137]

Reflecting citizen concern, certain States and local governments have contemplated or imposed moratoria on the construction of WTE projects or passed laws that effectively limit construction of new facilities. This movement corresponds to the period in which the EPA was under pressure by environmental and other concerned groups to implement more stringent pollution standards. Examples include the following:[138]

- In October 1991, Rep. Kostmayer (D-PA) introduced a bill in the U.S. House of Representative (H.R. 3253, "The Pollution Prevention, Community Recycling and Incinerator Control Act") that included a moratorium on new MSW incinerators until the year 2000, in order to encourage recycling. After 2000, incinerators could be built or expanded, but only if they comply with strict requirements. The bill did not become law, but it reflected the actions being taken at the State and local levels.
- The Wisconsin State legislature had before it a bill to impose a 2-year moratorium on the issuance of air permits for new WTE facilities, commencing in 1992. After debate, the bill did not pass.
- The State of Florida Department of Environmental Regulation, as a result of the lack of publication of new EPA standards on air emissions and mercury controls and the desire to create time to assess the need for new incinerators, strongly supported a 2-year moratorium on construction, beginning in mid-1992. A measure was introduced in the Florida House to that effect. Ultimately, in 1993 Florida imposed tough mercury standards in advance of the EPA's regulations. These were the toughest in the country at the time.
- The Baltimore City Council passed a 5-year moratorium on new incinerators, beginning in 1992.
- On July 14, 1992, the Governor of Rhode Island signed into law the State's 1993 budget, containing an amendment (Article 101) prohibiting the Rhode Island Solid Waste Management Corporation from building two WTE facilities that had been procured.
- New Jersey implemented a 4-month moratorium on the construction of new waste incinerators from May 1990 to August 1990. In 1991, the State implemented solid waste policies that constituted a *de facto* moratorium on incinerator development. In essence, the policies had as their goals to minimize incineration, regionalize solid waste disposal facilities, and reach a 60-percent recycling goal by 1995.
- A new focus, "environmental justice," has emerged at the State and local levels in the past few years. A number of States, including California, New York, Florida, Michigan, Minnesota, and Virginia, have introduced bills or passed into law legislation that imposes restrictions on the siting of "high-impact environmental projects" (such as incinerators) in low-income areas with a high percentage of minority residents.

On the other hand, the more restrictive air emission standards promulgated by the EPA in 1995 may satisfy some critics and, at least in part, remove a significant barrier to the growth of the WTE industry.

Legal Issues (Flow Control)

The Commerce Clause of the U.S. Constitution prohibits State or local regulations that discriminate against out-of-State commerce to protect local economic interests. In 1978, the Supreme Court held that household garbage was "commerce" within the meaning of the Commerce Clause and that New Jersey's attempt to preserve landfill capacity for in-State garbage was unconstitutional.[139] This and subsequent cases have been interpreted to mean that a State may not prohibit a private landfill or waste disposal facility from accepting out-of-State garbage or imposing a surcharge or tax on such waste. The Court has consistently found no rational basis for restricting or surcharging out-of-State wastes.[140] The Court has extended its rulings to include "hazardous" waste within the scope of the Commerce Clause.[141]

[137]Personal communication with Maria Zannes, Integrated Waste Services Association (October 16, 1996).

[138]Personal communication with Eileen Berenyi, Governmental Advisory Associates, Inc. (October 18, 1996).

[139]*Philadelphia v. New Jersey*, 437 U.S. 617 (1978).

[140]*Fort Gratiot Sanitary Landfill, Inc. v. Michigan Dept. of Natural Resources*, 112 S. CT. 2019 (1992); *Oregon Waste Systems, Inc. v. Department of Environmental Quality*, 114. Ct. 1345 (1994).

[141]*Chemical Waste Management, Inc. v. Hunt*, 112S. CT. 2009 (1992).

The basic principle of these opinions, that local regulation may not discriminate against interstate commerce solely to advance local economic interests, has been applied to strike down local flow control ordinances. In 1994, in C&A Carbone, Inc. v. Town of Clarkstown (Carbone), the Supreme Court held that a law requiring all locally produced solid waste to be processed at a local processing business violated the Commerce Clause.[142] In Carbone, the town adopted a flow control ordinance requiring all nonhazardous solid waste within Clarkstown, New York, to be processed at the town transfer station. The purpose of the ordinance was to subsidize construction of the transfer station; its effect was to eliminate competition from other processors in the town. The Court found the local regulation to be a trade barrier against competition from out-of-State waste processors and, therefore, unconstitutional. Other courts have followed the holding in Carbone. For example, the Third Circuit Court of Appeals struck down a New Jersey flow control ordinance, and a Middle District of Georgia court struck down local measures designed to ensure that waste would remain in the local market.

The Carbone decision is significant because financing for WTE facilities is typically secured through a guarantee of revenues from tipping fees and energy sold. To ensure an ample supply of waste resources, and ultimately revenue, local governments passed ordinances mandating that local waste be sent to the local facility. Such ordinances favor local facilities strictly on the basis of location and deprive waste haulers of the opportunity to seek the least expensive disposal alternative.

The Supreme Court's decision makes financing of WTE projects more difficult and more expensive due to the increased risk. As evidence of this point, a recent U.S. Court of Appeals decision for the Third Circuit following the Carbone ruling (Summer 1995) invalidated a New Jersey flow control ordinance. Shortly thereafter, Moody's Investor Service downgraded the credit ratings for five New Jersey WTE facilities. However, several cases decided by Federal courts have clarified the extent to which flow control in municipal contracts with private haulers can be legally implemented (see Chapter 9).

Environmental Regulations

Clean Air Act

The WTE industry is regulated under a number of environmental programs administered by the EPA and State regulatory agencies. In October 1995, the EPA promulgated new Clean Air Act (CAA) regulations for municipal waste combustors, including WTE plants. These CAA standards govern much of the design and operation of waste-fueled power plants.

Background of CAA Regulations for Municipal Waste Combustors

On December 20, 1989, the EPA proposed new guidelines and standards for municipal waste combustors (MWCs) under the authority delineated in Section 111 of the Clean Air Act of 1977 (CAA). Regulation in the 1989 guidelines and standards was based on "best available control technology" or "BACT." The new standards were promulgated on February 11, 1991, for new MWCs, and guidelines were issued for existing MWCs.

On November 15, 1990, amendments to the CAA were enacted by Congress and signed into law. The amendments added Section 129 to the CAA, specifying that standards and guidelines be developed for both large and small MWCs and that revised standards and guidelines reflect more restrictive performance levels than those included in the 1991 regulations.

Section 129 established a schedule for revising the 1991 standards and guidelines and implementing new standards, which EPA did not meet. As a result, the Sierra Club, the Natural Resources Defense Council, and the Integrated Waste Services Association filed a complaint in U.S. District Court. Under a consent decree, EPA was required to promulgate new standards no later than October 31, 1995, which were published as of December 19, 1995.

The 1995 revised standards are more stringent than those issued in 1991. In addition, the revised standards apply to all MWCs above 35 megagrams (about 40 tons) per day, not just to large MWCs above 225 megagrams (about 250 tons) per day, as the earlier standards and guidelines did.

Under the December 1995 rule, New Sources are defined as those MWCs that began construction after September 20, 1994, or began modification or reconstruction after June 19, 1996. MWCs constructed, modified, or reconstructed between December 20, 1989, and September 20, 1994, continue to be regulated under the 1991 standards; however, they must be upgraded to reduce mercury and fugitive ash emissions to the 1995 guidelines.

[142]*C&A Carbone, Inc. v. Town of Clarkstown, New York,* No. 114, S. Ct. 1677 (1994).

The 1990 CAA amendments call for the EPA to establish new air emission limits for everything that emits pollution, from power plants to lawn mowers. As part of this sweeping environmental mandate, EPA Administrator Carol Browner signed air pollution control standards in 1995 called "Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Municipal Waste Combustors." The New Source Performance Standards regulate facilities built after 1995. The Emission Guidelines regulate existing, operating facilities. The Emission Guideline standards are intended to ensure that facilities use the "maximum achievable control technology" or "MACT." The rules apply to all new and existing WTE plants and incinerators with the capacity to burn more than 40 tons of garbage per day.

In total, the EPA estimated that about 130 plants (including those that do not convert waste into energy or do not market energy) will be covered by the MACT rule. Many existing facilities currently are designed with state-of-the-art high-temperature combustion systems, scrubbers, and baghouses or high-efficiency electrostatic precipitators and can meet the new emission limits with relatively minor or no equipment additions. Other facilities must make significant retrofits to their existing air pollution control equipment.

Shortly after promulgation of the MACT standards, Davis County Solid Waste Management District, Waste Energy Partners, and the Cement Kiln Recycling Coalition brought suit against the EPA, challenging the standards for existing facilities. The petitioners contended that EPA inappropriately based emission limits on the size of a facility versus the size of an individual unit at a facility. Nearly a year after the CAA rules were promulgated by the EPA (December 6, 1996), the U.S. District Court of Appeals for the District of Columbia handed down a decision that would vacate the rules. However, the decision left open possibilities for the EPA to keep intact the rules for large facilities and a significant number of small facilities while repromulgating rules for a smaller category of facilities.

Under the MACT rules as originally written, facilities with design capacity under 250 tons per day had a different set of emission limits than those with design capacity greater than 250 tons per day. This simple division based on facility and not unit size led to situations where facilities with three 100-ton-per-day units (furnaces) would have to meet the emission standards for large facilities despite the fact that a facility with only two of the same 100-ton-per-day units would meet the substantially less stringent standards for small facilities. The Court decision instructed EPA to correct the MACT and NSPS rule by basing emission limits on unit size at facilities.

EPA may file a motion within 45 days of the Court decision for reconsideration by the Court and requesting that the standards for large and many small units not be vacated. If the Court does not reverse its decision by mid-February, EPA contends that it could repromulgate the rule for large facilities within a short time and without changing the standards. Large facilities account for more than 80 percent of the design capacity in the United States.

The Court decision has not slowed retrofit schedules at facilities, especially at large facilities that may not be significantly impacted if EPA promulgates its rules within the year. Minor changes to plant design and operations have been accomplished since promulgation in 1995. Some of the more extensive retrofits—such as adding a scrubber and baghouse—are still on schedule to be completed within 1 to 3 years after States adopt the Federal rules, but no later than the year 2000. EPA estimates a household might pay less than 5 cents to as much as 3 dollars a month more for disposal at facilities that must add new pollution control equipment. Technologies that will be added to existing facilities include a baghouse, scrubber, selective noncatalytic reduction (SNCR), and carbon injection systems (see box on page 84).

EPA estimated that the MACT rule will reduce emissions of cadmium, lead, mercury, dioxin, sulfur dioxide, hydrogen chloride, nitrogen dioxide, and particulate matter by approximately 145,000 tons per year. Based on emissions data collected by EPA, full implementation of the rule will reduce dioxin emissions from MWCs by at least 99 percent, so that MWCs will represent less than 1 percent of the known sources of dioxin when the rule is implemented. EPA also estimated that the rule will yield about a 90-percent reduction in emissions of mercury from the facilities, based on 1990 levels, so that MWCs will represent about 3 percent of the U.S. inventory for mercury emissions.[143]

The emission guidelines for existing facilities set emission limits for dioxin/furans, cadmium, lead, mercury, sulfur dioxide, hydrogen chloride, particulate matter, opacity, nitrogen oxides, fugitive emissions, and carbon monoxide. The new source rule includes stringent limits on particulate matter, opacity, sulfur dioxide, hydrogen chloride, dioxin/furans, nitrogen

[143]U.S. Environmental Protection Agency, "Final Air Regulation for Municipal Waste Combustors," fact sheet (October 31, 1995).

MACT Standards: New Clean Air Act Rules for Waste-to-Energy Facilities

Some facilities currently are designed to meet the new emissions limits. Others must add or retrofit newer technology to their existing air pollution control equipment. Minor changes to plant operations may be accomplished soon. More extensive retrofits will be completed no later than the year 2000. Retrofit technologies include:

- A **"bag house"** that works like a giant vacuum cleaner with hundreds of fabric filter bags which clean the air of soot, smoke, and metals.
- A **"scrubber"** which sprays a slurry of lime into the hot exhaust. The lime neutralizes acid gases, just as a gardener uses lime to neutralize acidic soil. Scrubbing also can improve the capture of mercury in the exhaust.
- **"Selective noncatalytic reduction" (SNCR)** that converts nitrogen oxides—a cause of urban smog—to harmless nitrogen by spraying ammonia or urea into the hot furnace.
- **"Carbon injection systems"** that blow charcoal into the exhaust gas to absorb mercury. Carbon injection also controls organic emissions such as dioxins.

MACT Rules for Existing Plants

Emission	Limit	Emission	Limit
Dioxin/Furans	(/dscm)	**SO_2**	
Small	125 ng	Small	80 ppm or 50% removal
Large			
ESP-equipped units	60 ng	Large	31 ppm or 75% removal
All others	30 ng		
Cd	(/dscm)	**HCl**	
Small	0.10 mg	Small	250 ppm or 50% removal
Large	0.04 mg	Large	31 ppm or 95% removal
Pb	(/dscm)	**Opacity**	10%
Small	1.6 mg		
Large	0.49 mg	**Hg** (/dscm)	0.080 mg or 85% removal
Particulates		**Fugitives**	Visible less than 5% of the time
Small	70 mg		
Large	27 mg		

NO_x: Operator of large plants may select one of two options:

Option A: Units must meet the following standards:

Mass Burn/Waterwall	200 ppm	Fluidized Bed	290 ppm
RDF	250 ppm	Refractory	Exempt
Mass Burn Rotary	250 ppm	Other	210 ppm

Option B: Plants may "bubble" units within the plant to meet the following standards:

Mass Burn/Water Wall	180 ppm	Fluidized Bed	260 ppm
RDF	230 ppm	Refractory	Exempt
Mass Burn Rotary	220 ppm	Other	190 ppm

CO			
Modular	50 ppmv	Mass Burn	250 ppmv
Mass Burn		Rotary/Waterwall	150 ppmv
Rotary/Waterwall,	100 ppmv	Pulverized Coal, RDF	
Refractory, Fluidized Bed		Mixed	200 ppmv
		Spreader Stoker Coal/	
		RDF Mixed, RDF Stoker	

(Continued on page 85)

MACT Standards: New Clean Air Act Rules for Waste-to-Energy Facilities (Continued)

MACT Rules for New Plants

Emission	Limit	Emission	Limit
Dioxin/Furans	13 ng/dscm	**SO_2**	30 ppm or 80% removal
Cd	0.020 mg/dscm	**HCl**	25 ppm or 95% removal
/Pb	0.20 mg/dscm	**Opacity**	10%
PM	24 mg	**Hg** (/dscm)	0.080 mg or 85% removal
Fugitives	Visible less than 5% of the time	**NO_x** First year After 1st year	 180 ppm 150 ppm
CO Modular/Mass Burn Fluidized Bed RDF	 100 ppmv 150 ppmv	**Complete**	Siting Analysis Materials Separation Plan Public Meetings

dscm = dry standard cubic meter.

Note: Small plants include facilities that burn between 38 tons but no more than 250 tons per day. Large plants are defined as those that burn more than 250 tons per day of waste.

Source: Integrated Waste Services Association, "Waste-to-Energy Environmental Rules Among World's Toughest" (Washington, DC, November 1, 1995).

oxides, cadmium, lead, carbon monoxide, and mercury. Specific requirements are included in the rule governing new plants for public participation and materials separation/recycling plans. The regulation allows local communities to consider their unique circumstances in helping to plan for new plants, including the design of materials separation/recycling plans.

States in which WTE plants are located must submit a State implementation plan (SIP) by December 31, 1996, including standards that are at least as stringent as those promulgated by EPA. After States adopt the final rule and EPA has approved the SIP, large combustors burning more than 250 tons of trash per day will have 1 year to comply with the regulation. The MACT rule does provide for up to 3 years for compliance in special, case-by-case circumstances. Small combustors burning less than 250 tons of trash per day will have 3 years to comply with the regulation. EPA estimated the total nationwide annual cost of the regulation at $488 million for new and existing sources.[144]

The Resource Conservation and Recovery Act: Municipal Solid Waste Combustor Ash

The Resource Conservation and Recovery Act (RCRA) governs the disposal of solid and hazardous waste, including testing requirements to determine the characteristics of waste. The solid waste law contains an exemption for WTE facilities, allowing that household trash burned in the plant is not subject to testing. The WTE industry long held the view that the exemption extended to the ash residue remaining after the burning process. But in 1994, the Supreme Court ruled that although the RCRA statute specifically exempts facilities from testing incoming trash, the exemption does not extend to the remaining ash. As a result of the Supreme Court decision, WTE facilities began testing ash for its hazardous characteristics in accordance with the Toxicity Characteristic Leaching Procedure (TCLP) that subjects ash to acidic liquid, causing metals to leach from the material. If metals leach in amounts greater than a fraction of a percent, the ash is considered hazardous. After years of testing, the ash has consistently passed TCLP, thus remaining acceptable for disposal at municipal landfills.

The EPA issued a series of decisions and interpretative directives to States concluding that the ash should be tested when it first meets the environment—most often as it is loaded onto trucks prior to being shipped to a landfill or other use. These EPA decisions allow facilities to mix fly and bottom ash before testing and disposal. Fly ash, which is captured from stack gases, tested by itself, may have a much higher proportion of heavy metals, polyaromatic hydrocarbons, and dioxins than bottom ash. EPA also issued a detailed guidance document governing how the TCLP test should be

[144]U.S. Environmental Protection Agency, "Final Air Regulation for Municipal Waste Combustors."

administered. The Supreme Court decision, coupled with the EPA's directives, has settled the issue of ash disposal for the WTE industry into the foreseeable future.

A sense of certainty has led local officials and State regulators to consider the beneficial use of ash. The most common use for ash is as landfill roadbed material and daily and final landfill cover. Pilot projects are underway in more than a dozen States to test the physical properties of ash for use in road aggregate, granular base, asphalt mixture, and the construction of artificial reefs and cement blocks. Ash represents about 10 percent by volume of the trash combusted. Ferrous metals are removed at the facility, leaving a residue that looks like wet cement. WTE residue has physical properties similar to construction mixtures such as concrete or asphalt. After a short time, the ash cures and resembles concrete, thus making commercial use possible (see box on page 87).

A major advantage of combusting waste is that it permits the recycling of high-grade ferrous metals. Last year the industry recycled almost 740,000 tons of ferrous metals. These metals are unique residuals of the combustion process and most would not otherwise be available for recovery.[145]

Utility and Energy Regulations

The Public Utility Regulatory Policies Act of 1978

The Public Utility Regulatory Policies Act of 1978 (PURPA), as implemented by the Federal Energy Regulatory Commission (FERC), requires utilities to buy power from qualifying facilities (QFs), which can be either qualifying cogeneration facilities (generators of thermal as well as electrical energy) or qualifying small power production facilities (generators of electrical energy using specified energy sources). WTE facilities of 80 megawatts or less can qualify as small power production facilities. Other types of non-WTE projects can qualify as well if they meet FERC requirements.

FERC does not set the purchase price, but utilities must purchase energy produced by the QFs at a price which is "fair and reasonable" and nondiscriminatory, or the utility's avoided cost. FERC, responsible for the oversight of the implementation of PURPA, delegated the responsibility of the avoided cost calculation to the States and their respective public utility commissions. Avoided cost was defined as the utility's marginal cost of the production or purchase of energy. Over time, however, "competitive bidding" displaced avoided costs as the accepted method of determining a price that is fair and reasonable. Competitive bidding eliminated much of the arbitrariness associated with determining the rate utilities must pay QFs for their electric power.

Because of PURPA, there was substantial growth in the market for power produced by the independent power industry including WTE projects. However, as fossil fuel prices have dropped, total generating capacity has increased, and the wholesale utility market has become increasingly competitive, avoided costs have dropped throughout the country.

Energy Policy Act of 1992

The Energy Policy Act of 1992 (EPACT) created a new class of wholesale-only electric generators—"exempt wholesale generators" (EWGs)—which are exempt from the Public Utility Holding Company Act of 1938. EPACT dramatically enhanced competition in U.S. wholesale electricity generation markets, permitting broader participation by subsidiaries of electric utilities and other nonqualifying facilities. Under the Act, EWG status for WTE facilities and other generators is obtained on a case-by-case basis from FERC. Because the law does not target generators by size, type of fuel, or technology, it has limited the competitive advantage of QFs in the wholesale power marketplace as States accelerate the trend toward all-source bidding, in which all facilities compete to be the lowest bidder. In this environment, the WTE has no advantage unless credit is given to renewable fuels.

Recent Decisions

In response to a filing by Connecticut Light & Power, FERC held that PURPA prohibits a State from mandating utility purchases from QFs above avoided cost. In another decision, FERC overturned an order by the California Public Utility Commission that required regulated utilities to purchase specified quantities of energy from renewable sources. The ruling was based on the rationale that such purchases would lead to prices in excess of avoided cost. In New York, six of the State's seven investor-owned utilities recently relied on the FERC's order in the California case to withdraw from a New York Public Service Commission approved ruling calling for the purchase of 300 megawatts of renewable energy from independent producers.

[145]Integrated Waste Services Association, *The 1996 IWSA Municipal Waste Combustion Directory of United States Facilities* (Washington, DC, May 1996), p. 10.

In 1996, FERC issued Order 888, dealing with open-access transmission, and Order 889, dealing with stranded costs. The open access transmission rule functionally unbundles transmission from generation by requiring utilities to open their transmission systems to all wholesale transmission on a real-time, nondiscriminatory basis. Many issues related to regional control, system stability, and network pricing versus point-to-point pricing remain to be decided. Priority issues among native load and other customers and jurisdictional issues between retail and wholesale customers are still unclear.

State Waste-to-Energy Ash Reuse Projects

California

- Since 1991, combined ash from the Commerce Refuse-to-Energy Facility has been used as subbase for roads at the Puente Hills Landfill in Whittier (Los Angeles County).
- The City of Long Beach uses ash as daily cover at the county landfill.

Connecticut

- Ash from the Bridgeport WTE plant has been used since 1988 as a grading cap over a discontinued MSW/hazardous waste landfill.
- The Connecticut Resources Recovery Authority used an ash-asphalt mixture from the Bridgeport facility in 1992 to pave a 600-foot access road at its Shelton Landfill.

Florida

- Starting in 1984, Pinellas County WTE ash has been used as daily landfill cover and for roadbase/berm construction on a site owned and operated by the county.

Hawaii

- Honolulu's WTE plant is studying and demonstrating the reuse of its ash as landfill cover and roadbed construction material.

Massachusetts

- In January 1992, an access road to the SEMASS WTE facility on Cape Cod was built using ash in the pavement subbase and in both the top and base courses. The parking lot at the facility has an ash material subbase.
- In 1979, combined ash from the Saugus WTE plant was used on nearly a mile of Route 129 in Lynn as part of an asphalt pavement mixture. A Federal Highway Administration report found that the roadway was in excellent condition.
- Ash from the Saugus WTE plant has been used as a grading cap over a discontinued MSW landfill since 1975.

New Hampshire

- In May 1993, a 1,150-foot stretch of U.S. Route 3 in Laconia was paved with a mixture of asphalt and ash from the Concord WTE facility.

New Jersey

- In July 1996, 750 feet of Center Drive in Elizabeth was paved with a mixture of asphalt and ash from the Warren County WTE facility.

New York

- In 1990, the New York State Department of Environmental Conservation granted approval to Islip for the use of ash as a gas venting layer material in the closure of the Blysdenburg Landfill.
- In October 1990, researchers at the State University of New York (SUNY) used more than 9,000 ash blocks to build a boathouse on the SUNY campus at Stony Brook, Long Island. Air quality monitoring and other tests have indicated no adverse environmental impacts.
- In 1987 and 1988, SUNY researchers built two artificial reefs, one using ash blocks and the other using cement concrete, in Conscience Bay off Long Island. The ash blocks have shown no deterioration of structural integrity (the standard blocks are breaking apart) and are not adversely impacting the environment.

Ohio

- In 1991, the Montgomery County Department of Solid Waste Management built an ash management building from ash blocks, using ash from the county's mass burn facilities.

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State Waste-to-Energy Ash Reuse Projects (Continued)

Pennsylvania

- The Pennsylvania Department of Environmental Protection, in October 1993, approved the use of ash at the Lanchester Landfill in Honey Brook as daily cover and as roadbed material for on-site roads.
- A portion of the ash from a waste-to-energy facility in Camden County, New Jersey, is used as daily cover material at a landfill in Pennsylvania.

Tennessee

- Ash from the Sumner County Resource Authority's Nashville facility is marketed as structural fill for use in road construction.

Texas

- The Federal Highway Administration in 1974 and 1977 used combined ash as a road base material on an access roadway and residential street in Houston. Ongoing monitoring for engineering performance indicated that ash was acceptable as a construction material.

Virginia

- Blocks produced from MWC ash and concrete were used to construct about 150 feet of revetment to help restore a badly eroded section of beach at Rudee Inlet near Virginia Beach.

Source: Integrated Waste Service Association, "Waste-to-Energy Ash Reuse Projects" (Washington, DC, September 20, 1996).